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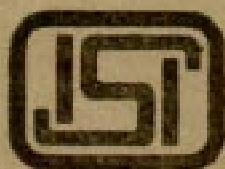
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*Indian Standard*

CODE OF PRACTICE FOR SELECTION OF DISC  
INSULATOR FITTINGS FOR HIGHEST SYSTEM  
VOLTAGES OF 72.5 kV AND ABOVE

UDC 621.315.65



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**INDIAN STANDARDS INSTITUTION**  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 110002

# Indian Standard

## CODE OF PRACTICE FOR SELECTION OF DISC INSULATOR FITTINGS FOR HIGHEST SYSTEM VOLTAGES OF 72.5 kV AND ABOVE

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# *Indian Standard*

## CODE OF PRACTICE FOR SELECTION OF DISC INSULATOR FITTINGS FOR HIGHEST SYSTEM VOLTAGES OF 72.5 kV AND ABOVE

### 0. FOREWORD

**0.1** This Indian Standard was adopted by the Indian Standards Institution on 25 January 1982, after the draft finalized by the Electrical Insulators and Accessories Sectional Committee had been approved by the Electrotechnical Division Council.

**0.2** This code of practice for selection of disc insulator fittings has been prepared with a view to achieve uniformity in the application of these fittings for highest system voltages of 72.5 kV and above.

**0.3** The figures for various insulator fittings and insulator sets given in this standard are indicative of the general shape only and are not according to scale. These are for guidance in selection of appropriate insulator fittings for highest system voltages. The dimensions, where relevant, are given in the tables along with the figures.

**0.4** This code of practice is one of a series of standards for insulator fittings for overhead power lines. Other standards in this series are:

IS : 2486 Specification for insulator fittings for overhead power lines with a nominal voltage greater than 1 000 V:

( Part I )-1971 General requirements and tests

( Part II )-1974 Dimensional requirements

( Part III )-1974 Locking devices

( Part IV )-1981 Tests for locking devices

**0.5** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960\*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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\*Rules for rounding off numerical values ( revised ).

## **1. SCOPE**

**1.1** This code of practice provides guidance for selection of disc insulator fittings for overhead power lines with highest system voltages of 72.5 kV and above.

## **2. TERMINOLOGY**

**2.1** For the purpose of this standard, the definitions given in IS : 1885 ( Part LIV )-1980\* shall apply.

## **3. FITTINGS FOR SUSPENSION INSULATOR SETS**

**3.1** Each single suspension string for voltage from 72.5 to 245 kV shall consist of the following fittings assembled in the order as shown in Fig. 1.

- a) Ball-hook,
- b) Socket-tongue, and
- c) Suspension clamp.

**3.2** Each double suspension insulator set consisting of two insulator strings for voltages from 72.5 to 245 kV shall consist of the following fittings assembled in the order as shown in Fig. 2:

- a) Anchor shackle ( 2 Nos. ),
- b) Yoke plate,
- c) Ball-clevis ( 1 pair ),
- d) Socket-clevis ( 1 pair ),
- e) Yoke plate,
- f) Clevis-tongue, and
- g) Suspension clamp.

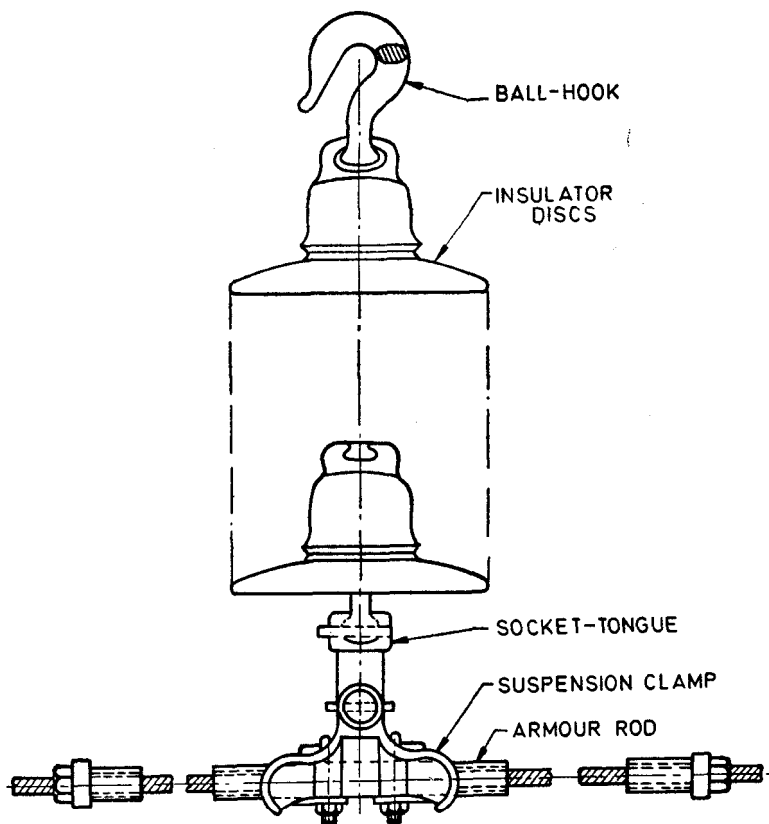
**3.3** Each single suspension string for 400 kV twin-conductor bundle line shall consist of the following fittings assembled in the order as shown in Fig. 3.

- a) Anchor shackle,
- b) Ball-eye,
- c) Arcing horn,
- d) Socket-clevis,
- e) Yoke plate,
- f) Grading rings ( 1 pair ),
- g) Clevis-tongue ( 1 pair ), and
- h) Suspension clamp ( 1 pair ).

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\*Electrotechnical vocabulary: Part LIV Insulators.

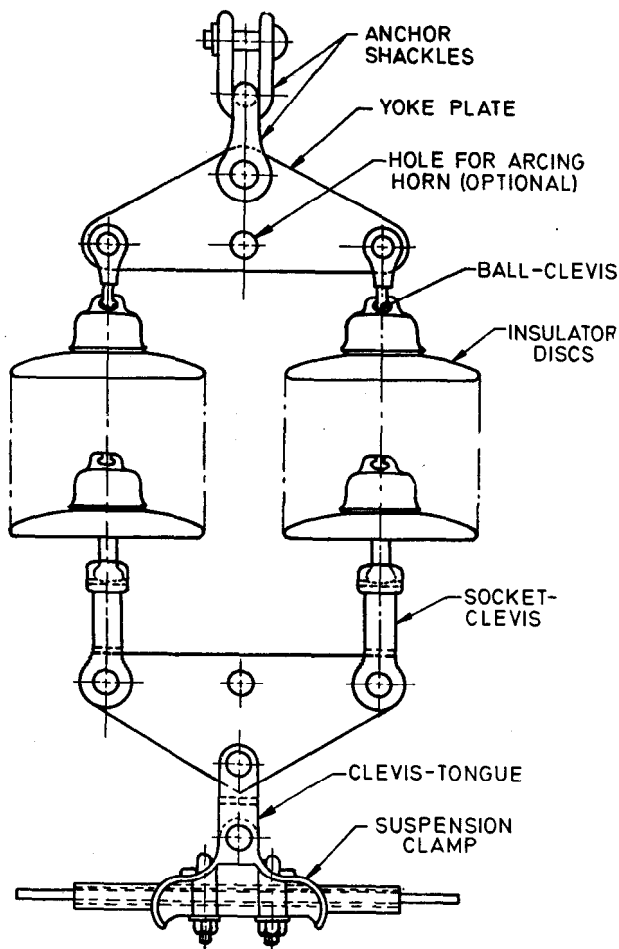




NOTE 1 — Horn holder type socket-tongue shall be permitted where necessary.

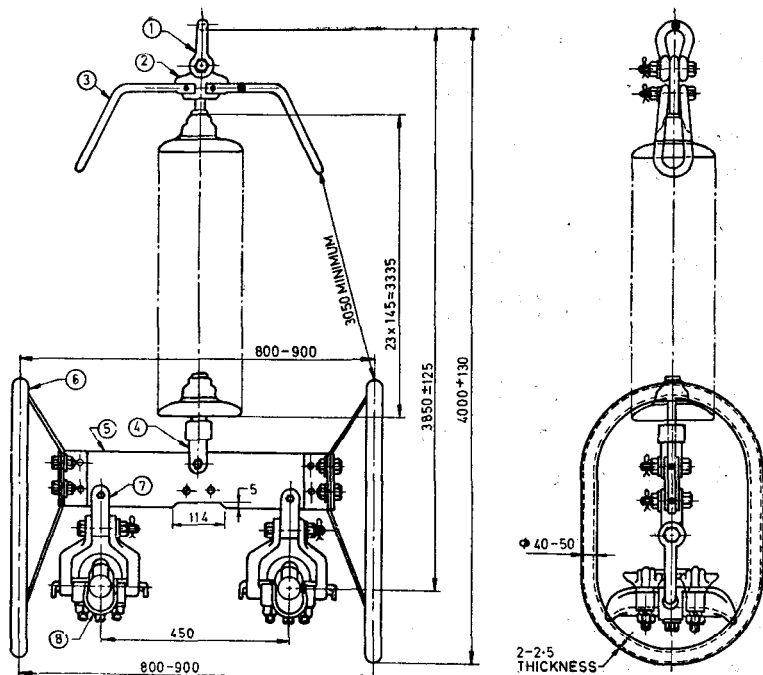
NOTE 2 — Type of the armour rod shall be as selected by the user.

FIG. 1 SINGLE SUSPENSION INSULATOR STRING



NOTE — Type of the armour rod shall be as selected by the user.

FIG 2. DOUBLE SUSPENSION INSULATOR SET CONSISTING OF TWO INSULATOR STRINGS



Sl. No.	DESCRIPTION	QUANTITY	MATERIAL	MECHANICAL STRENGTH
				kg
1.	Anchor shackle	1	Forged steel	11 500
2.	Horn holder ball-eye	1	Forged steel	11 500
3.	Arcing horn	1	Mild steel	150
4.	Socket-clevis	1	Malleable iron or forged steel	11 500
5.	Yoke	1	Mild steel	11 500
6.	Corona control ring	1 Set	Steel pipe/aluminium alloy pipe	150
7.	Clevis-eye	2	Malleable iron or forged steel	11 500
8.	Suspension clamp	2	Aluminium alloy	11 500

NOTE 1 — Spring washers shall be electro-galvanized.

NOTE 2 — All ferrous parts shall be hot-dip galvanized.

NOTE 3 — Ball and socket size shall be 20 mm.

NOTE 4 — Tolerance on length of hardware shall be  $\pm 2.0$  percent.

NOTE 5 — Nominal spacing tolerance for insulator discs only shall be  $\pm (0.03 \times \text{spacing} + 0.3)$  mm.

NOTE 6 — Arrangement shown are for 400 kV single suspension string with minimum electro-mechanical strength 11 500 kg.

NOTE 7 — The types of the various fittings and mode of attachment as shown are indicative only and not mandatory.

NOTE 8 — The type of armour rod shall be as selected by the user.

All dimensions in millimetres.

FIG. 3 400 kV SINGLE SUSPENSION STRING

**3.4** Each double suspension insulator set consisting of two insulator strings for 400 kV twin-conductor bundle line shall consist of the following fittings assembled in the order as shown in Fig. 4.

- a) Anchor shackle,
- b) Twisted shackle,
- c) Yoke plate,
- d) Ball-clevis ( 1 pair ),
- e) Socket-clevis ( 1 pair ),
- f) Yoke plate,
- g) Grading rings ( 1 pair ),
- h) Clevis-tongue ( 1 pair ), and
- j) Suspension clamp ( 1 pair ).

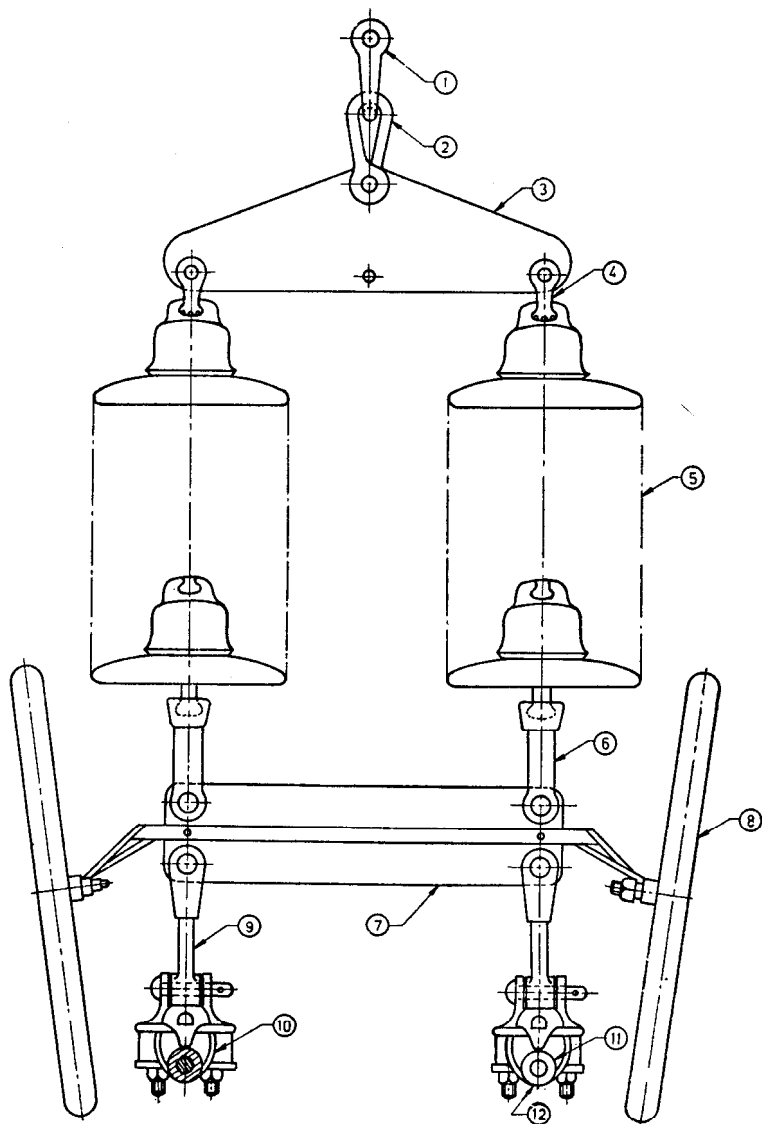
#### **4. FITTINGS FOR TENSION INSULATOR SETS**

**4.1** Each single tension string for voltages from 72.5 to 245 kV shall consist of the following fittings assembled in the order as shown in Fig. 5.

- a) Anchor shackle,
- b) Ball-clevis,
- c) Socket-clevis, and
- d) Strain clamp ( compression type ).

**4.2** Each double tension insulator set consisting of two insulator strings for voltages from 72.5 kV and 245 kV shall consist of the following fittings assembled in the order as shown in Fig. 6.

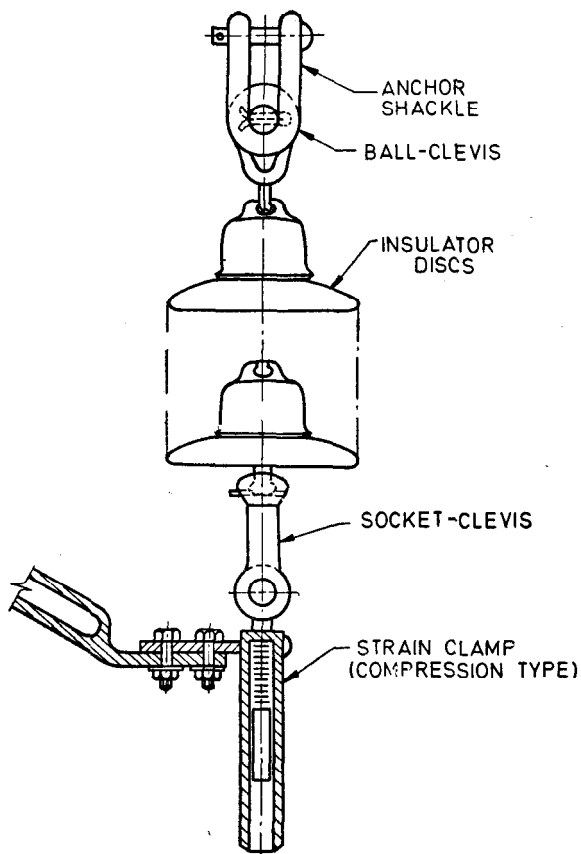
- a) Anchor shackle ( 2 Nos. ),
- b) Yoke plate,
- c) Ball-clevis ( 1 pair ),
- d) Socket-clevis ( 1 pair ),
- e) Yoke plate,
- f) Twisted shackle, and
- g) Strain clamp ( compression type ).



- |                    |                    |                      |
|--------------------|--------------------|----------------------|
| 1. Anchor shackle  | 5. Insulator discs | 9. Clevis-tongue     |
| 2. Twisted shackle | 6. Socket-clevis   | 10. Suspension clamp |
| 3. Yoke plate      | 7. Yoke plate      | 11. Armour rod       |
| 4. Ball-clevis     | 8. Grading rings   | 12. Conductor        |

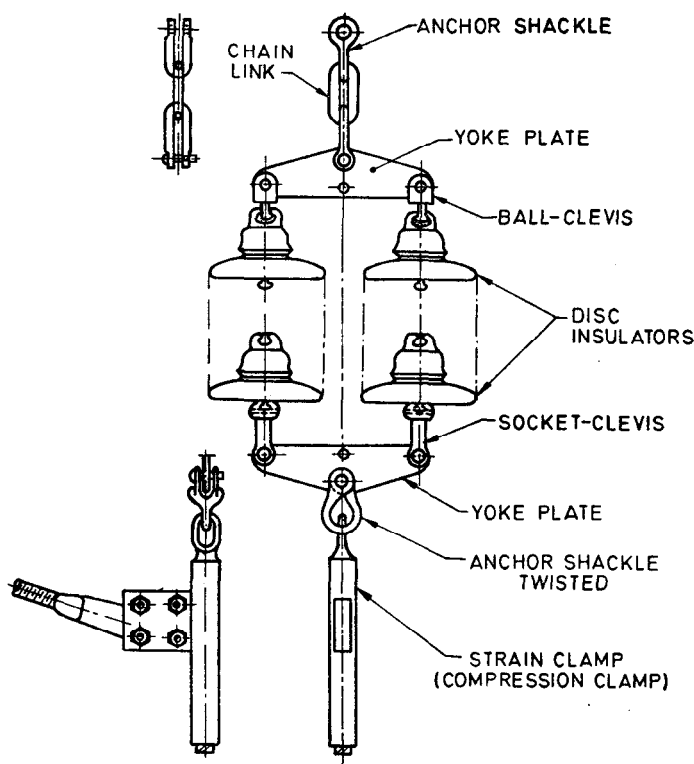
NOTE — The type of armour rod shall be as selected by the user.

FIG. 4 400 kV TWIN CONDUCTOR BUNDLE LINE SUSPENSION INSULATOR SET CONSISTING OF TWO INSULATOR STRING ASSEMBLY



NOTE — As an alternative to socket clevis, an assembly of socket eye and anchor shackle may be adopted.

FIG. 5 SINGLE TENSION INSULATOR STRING



NOTE — As an alternative to clevis-clevis an assembly of clevis eye and anchor shackle may be adopted.

FIG. 6 TENSION INSULATOR SET CONSISTING OF TWO INSULATOR STRINGS

4.3 Each double tension insulator set consisting of two insulator strings for 400 kV twin-conductor bundle line shall consist of the following fittings assembled in the order as shown in Fig. 7.

- |                              |                                   |
|------------------------------|-----------------------------------|
| a) Anchor shackle,           | h) Yoke plate,                    |
| b) Chain link,               | j) Grading ring ( 1 pair ),       |
| c) Anchor shackle,           | k) Clevis-eye ( 1 pair ),         |
| d) Yoke plate,               | m) Sag adjuster plate ( 1 pair ), |
| e) Ball-clevis ( 1 pair ),   | n) Anchor shackle ( 1 pair ), and |
| f) Arcing horn,              | p) Tension clamp ( 1 pair ).      |
| g) Socket-clevis ( 1 pair ), |                                   |

NOTE — Where necessary, the purchaser may specify arcing horns for the suspension and tension string assemblies covered in 3 and 4.

## 5. STRENGTH OF INSULATOR HARDWARES

**5.1** The strength of the insulator fittings constituting the insulator string shall be so selected as to suit the conductor size and loading conditions of the line. The electromechanical strength of insulators may be based on the maximum working tension of the conductor taking into account the requisite factor of safety. The yield point strength of the fittings of insulator string shall be at least equal to the electromechanical strength of the insulator.

## 6. MATERIAL FOR INSULATOR FITTINGS

**6.1 General** — All fittings except suspension clamp and strain clamp shall be made of drop-forged or up-set forged steel or heat-treated malleable cast iron [ see IS : 2486 ( Part I )-1971\* ] and shall be hot-dip galvanized, after all machining and fitting have been completed. The suspension clamp and the strain clamp shall be of high strength aluminium alloy for AAC and ACSR conductors. In strain clamp compression type, the outer sleeve shall be of EC grade aluminium and inner sleeve shall be of mild steel galvanized.

**6.1.1** The material of the fittings shall be so selected that yield strength of the material shall be not less than the maximum working load. No deformation shall be permitted when tested for this requirement.

**6.1.2** The fittings shall be corrosion resistant. All ferrous parts shall be hot-dip galvanized in conformity with IS : 4759-1968† and the uniformity of zinc coating shall satisfy the requirements of IS : 2633-1972‡. The parts shall be galvanized after machining. The finished galvanized surface shall be smooth. All castings shall be free from blow-holes and other casting defects such as cracks.

**6.1.3** The cottor pins shall be provided with mild steel flat washers in addition to split pins.

**6.1.4** The profiles of the fittings as shown in Fig. 1 to 7 are for general guidance only.

**6.1.5** The tolerances on the dimensions of the fittings shall be in accordance with the relevant Indian Standards [ see IS : 731-1971§, IS : 2486 ( Part I )-1971\*, IS : 2486 ( Part II )-1974||, IS : 2486 ( Part III )-1974¶ ]

\*Specification for insulator fittings for overhead power lines with a nominal voltage greater than 1 000 V: Part I General requirements and tests ( *first revision* ).

†Specification for hot-dip zinc coatings on structural steel and other allied products.

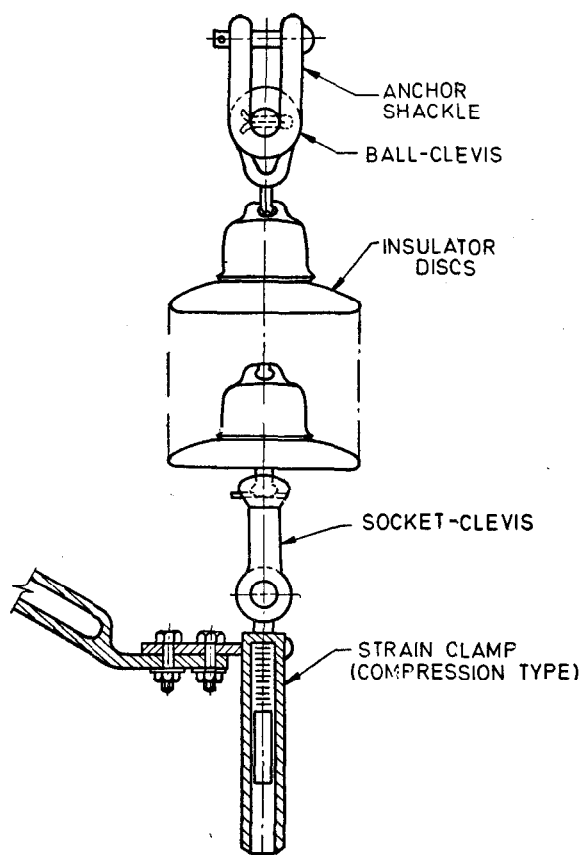
‡Methods of testing uniformity of coating on zinc coated articles ( *first revision* ).

§Specification for Porcelain insulators for overhead power lines with a nominal voltage greater than 1 000 V ( *second revision* ).

||Specification for insulator fittings for overhead power lines with a nominal voltage greater than 1 000 V: Part II Dimensional requirements ( *first revision* ).

¶Specification for insulator fittings for overhead power lines with a nominal voltage greater than 1 000 V: Part III Locking devices.





NOTE — As an alternative to socket clevis, an assembly of socket eye and anchor shackle may be adopted.

FIG. 5 SINGLE TENSION INSULATOR STRING

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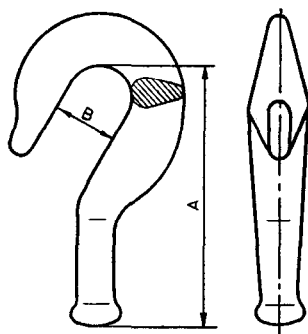
and IS : 2486 (Part IV)-1981\*]. For other fittings not covered by Indian Standards, the following tolerances on dimensions shall be applicable:

Dimensions up to and including 50 mm	$\pm 1$ mm
Dimensions greater than 50 mm	$\pm 2$ percent

**6.2 Ball-hook** — The ball-hook shall be of forged steel.

The shape and dimensions of the ball-hook shall be as shown in Fig. 8.

**6.3 Anchor Shackle** — The anchor shackle shall be of forged steel. The anchor shackle shall be complete with cottor bolt and cottor pin. The cottor bolt and the cottor pin shall be of forged steel.



DIMENSIONS		PIN BALL DESIGNATION*
A	B	
mm	mm	mm
85	22	16
95	25	20/16

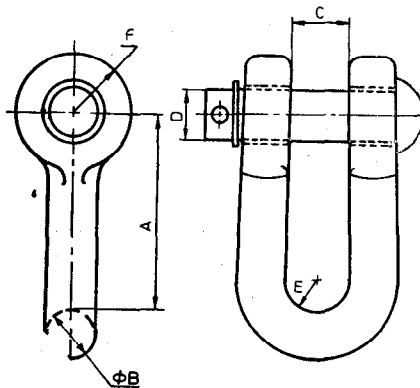
\*For details, see Fig. 8 of IS : 2486 (Part II)-1974 Specification for insulator fittings for overhead power lines with a nominal voltage greater than 1 000 V: Part II Dimensional requirements.

*Material* : Forged steel

**FIG. 8 BALL HOOK**

\*Specification for insulator fittings for overhead power lines with a nominal voltage greater than 1 000 V: Part IV Tests for locking devices.

The shape and dimensions of the anchor shackle shall be as shown in Fig. 9.



DIMENSIONS, mm					
A	B	C	D	E	F
76	16	19	16	11	19
76	16	19	16	11	19
76	19	22	19	14	22
89	22	25	22	19	25
102	25	29	25	19	25

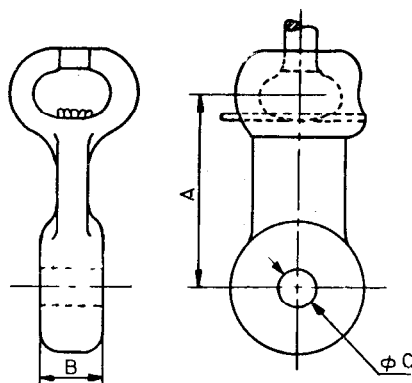
Material : Forged steel.

FIG. 9 ANCHOR SHACKLE

**6.4 Socket-tongue** — The socket-tongue shall be of forged steel or heat-treated malleable cast iron. The socket-tongue shall be suitable to the suspension clamp selected. The shape and dimensions of socket-tongue shall be as shown in Fig. 10.

**6.5 Suspension Clamp** — The suspension clamp required for use on ACSR and aluminium conductors shall be of aluminium alloy. The clamp bodies and the keeper pieces shall be of high strength aluminium alloy while cottor bolts, U-bolts and cottor pins shall be of forged steel galvanized.

The general shape and dimensions of the suspension clamp are shown in Fig. 11. The actual design of the clamp shall be subject to the agreement between the manufacturer and the purchaser. The bell mouth of the suspension clamp shall be designed to take into account the hypothetical catenary angle of the conductor which it holds, as well as the

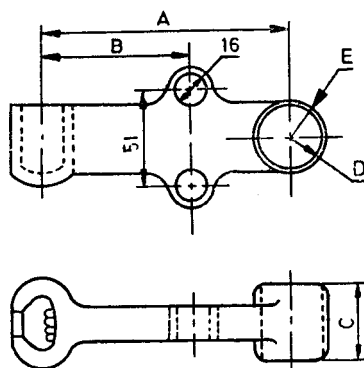


DIMENSIONS, mm			SOCKET SIZE
A	B	C	
51	16	17.5	<i>See Fig. 9 of IS : 2486 (Part II)-1974* for size 16 mm alternative B</i>
51	30	17.5	
51	35	17.5	
51	41	17.5	
51	48	17.5	
51	59	21.0	
51	66	17.5	
162	16	17.5	
162	19	17.5	
162	25	17.5	
162	30	17.5	<i>See Fig. 9 of IS : 2486 (Part II)-1974* for size 20 mm/16 mm alternative B</i>
162	38	21.0	
64	41	17.5	
64	47	17.5	
64	59	21.0	
64	66	17.5	
162	19	17.5	
162	25	17.5	
162	29	21.0	
162	38	21.0	

\*Specification for insulator fittings for overhead power lines with a nominal voltage greater than 1 000 V : Part II Dimensional requirements ( *first revision* ).

**Material**— Forged steel or heat-treated malleable cast iron.

FIG. 10A SOCKET-TONGUE



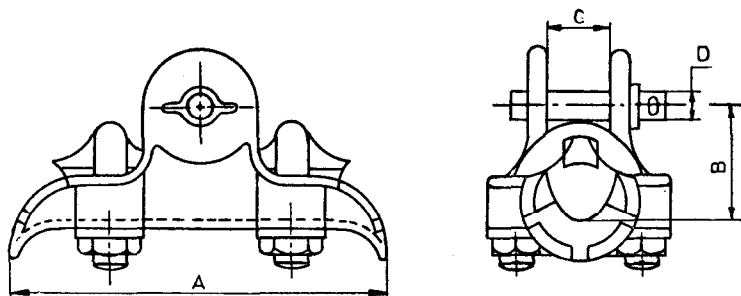
DIMENSIONS, <sup>7</sup> mm					SOCKET SIZE
A	B	C	D	E	
129	78	86	17.5	19	See Fig. 9 of IS : 2486 ( Part II )-1974* for size of 16 mm alternative B
129	78	105	17.5	19	
129	78	114	17.5	19	
203	95	29	21	22	
203	95	35	21	22	
203	95	38	21	22	See Fig. 9 of IS : 2486 ( Part II )-1974* for size of 20 mm/16 mm alternative B
203	95	29	21	22	
203	95	35	21	22	
203	95	38	21	22	

\*Specification for insulator fittings for overhead power lines with a nominal voltage greater than 1 000 V : Part II Dimensional requirements ( *first revision* ).

**Material** — Forged steel or heat-treated malleable cast iron.

FIG. 10B SOCKET-TONGUE ( HORN HOLDER TYPE )

effects of conductor vibration. The clamp body and the conductor groove of the keeper piece shall hold the conductor at mutually suitable curvature, so that the conductor receives maximum compression at the clamp centre, with gradually lessening compression as it reaches the bell mouth, in order that any vibration damage to conductor is minimized.



CONDUCTOR DIA, mm		DIMENSIONS, mm				SOCKET SIZE
Minimum	Maximum	A	B	C	D	
7.6	17.8	181	60.5	19	16	See Fig. 9 of IS : 2486 (Part II)-1974* for size 16 mm alternative B
12.7	21.1	190	63.5	22	16	
20.3	29.2	203	70.0	32	16	
25.4	38.9	228	85.5	42	16	
30.0	41.9	241	82.5	45	16	
38.1	50.8	254	101.5	54	16	
43.2	57.2	280	101.5	60	16	
50.8	63.5	279	108.0	67	16	See Fig. 9 of IS : 2486 (Part II)-1974* for size 20 mm/16 mm alter- native B
12.7	25.9	203	66.5	27	16	
22.9	35.6	222	71.5	37	16	
27.9	41.1	241	85.5	44	16	
31.8	47.0	254	89.0	48	16	
35.6	50.8	267	92.0	54	16	
44.4	57.2	279	101.5	60	16	
50.8	64.8	305	111.0	70	16	

\*Specification for insulator fittings for overhead power lines with a nominal voltage greater than 1 000 V : Part II Dimensional requirements (first revision).

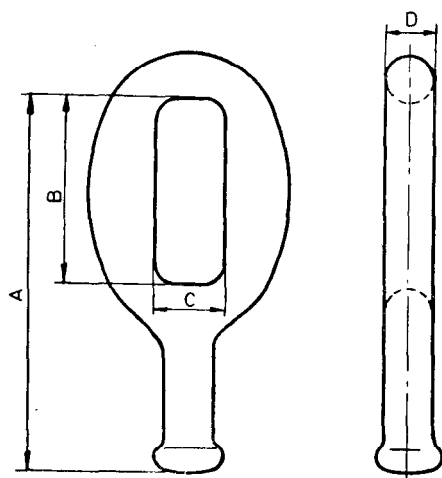
**Material**— Aluminium alloy ( U. bolts, cottor bolts and cottor pins shall be of forged steel ).

FIG. 11 SUSPENSION CLAMP

The slipping strength of the suspension clamp shall be not less than 50 percent of the maximum working tension of the conductor. However, the actual value shall be subject to the agreement between the manufacturer and the purchaser.

**6.6 Ball-Eye** — The ball-eye shall be of forged steel.

The shape and dimensions of ball-eye shall be as shown in Fig. 12.



DIMENSIONS, mm				PIN BALL DESIGNATION*
A	B	C	D	
102	51	19	12.7	20 mm/16 mm
114	63.5	22	16.0	„
114	63.5	25	19.0	„

\*See Fig. 8 of IS : 2486 ( Part II )-1974 Specification for overhead power lines with a nominal voltage greater than 1 000 V: Part II Dimensional requirements ( *first revision* ).

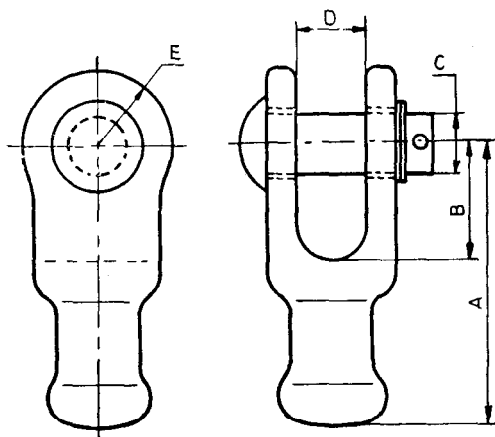
*Material* — Forged steel.

FIG. 12 BALL-EYE

**6.7 Ball-Clevis** — The ball-clevis shall be of forged steel. The ball-clevis shall be complete with cottor bolt and cottor pin. The cottor bolt and the cottor pin shall be of forged steel.



The shape and dimensions of the ball-clevis shall be as shown in Fig. 13.



DIMENSIONS, mm					PIN BALL DESIGNATION*
A	B	C	D	E	
76	32	16	19	20.5	16 mm
83	32	16	19	22	20 mm/16 mm
95	38	19	22	22	20 mm/16 mm
95	38	19	25	22	20 mm/16 mm

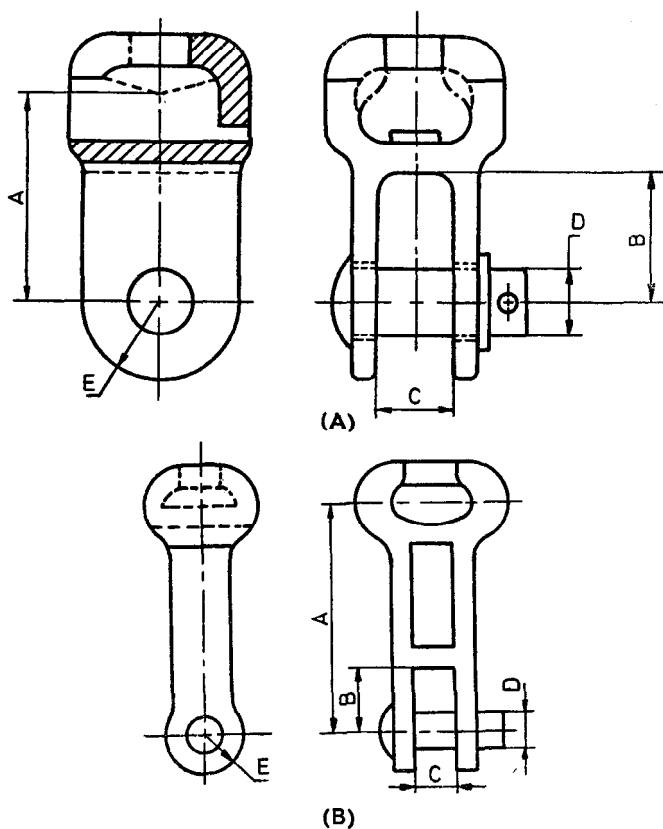
\*See Fig. 8 of IS : 2486 ( Part II )-1974 Specification for overhead power lines with a nominal voltage greater than 1000 V : Part II Dimensional requirements ( first revision ).

*Material* — Forged steel.

FIG. 13 BALL-CLEVIS

**6.8 Socket-Clevis** — The socket-clevis shall be of forged steel or heat-treated malleable cast iron. The socket-clevis shall be complete with cottor bolt and cottor pin. The cottor bolt and the cottor pin shall be of forged steel.

The shape and dimensions of the socket-clevis shall be as shown in Fig. 14.



FIGURE

DIMENSIONS, mm

SOCKET SIZE

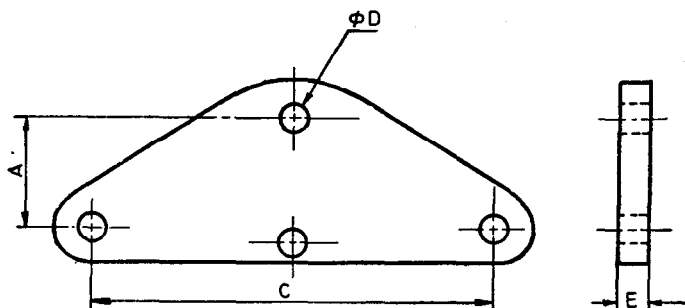
	A	B	C	D	E	
(a)	51	32	19	16	19	See Fig. 9 of IS : 2486 (Part II)-1974* for size 16 mm alternative B
(a)	51	32	19	16	25	
(b)	114	32	19	16	19	
(b)	114	38	19	16	25	
(b)	114	38	22	19	29	
(a)	54	32	19	16	25	See Fig. 9 of IS : 2486 (Part II)-1974* for size 20 mm/16 mm alternative B
(b)	114	38	19	16	27	
(b)	114	38	22	19	29	
(b)	114	38	25	19	29	

\*Specification for insulator fittings for overhead power lines with a nominal voltage greater than 1 000 V : Part II Dimensional requirements (first revision).

Material — Forged steel or heat-treated malleable cast iron.

FIG. 14 SOCKET-CLEVIS

**6.9 Yoke Plate** — The yoke plate shall be of mild steel. The shape and dimensions of yoke plate shall be as shown in Fig. 15.



DIMENSIONS, mm			
A	C	D	E
43	330	17.5	16
78	330	17.5	16
91	330	21	19
91	356	24	22

*Material* — Mild steel.

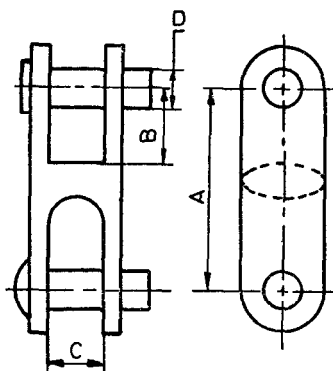
FIG. 15 YOKE PLATE

**6.10 Clevis-Clevis** — The clevis-clevis shall be of forged steel or heat-treated malleable cast iron. The clevis-clevis shall be complete with cottor bolts and cottor pins. The cottor bolts and the cottor pins shall be of forged steel.

The shape and dimensions of the clevis-clevis shall be as shown in Fig. 16.

**6.11 Strain Clamp** — The strain clamp shall be of heat-treated malleable cast iron or high strength aluminium alloy. The strain clamp for system voltage of 400 kV shall be of EC grade aluminium. The strain clamp shall have strength not less than that of the conductor.

The shape and dimensions of strain clamp shall be as shown in Fig. 17.



DIMENSIONS, mm			
A	B	C	D
75	32	19	16
75	32	22	16
75	32	24	16
85	38	27	16
92	38	27	19
100	38	27	19

*Material* — Forged steel or malleable cast iron.

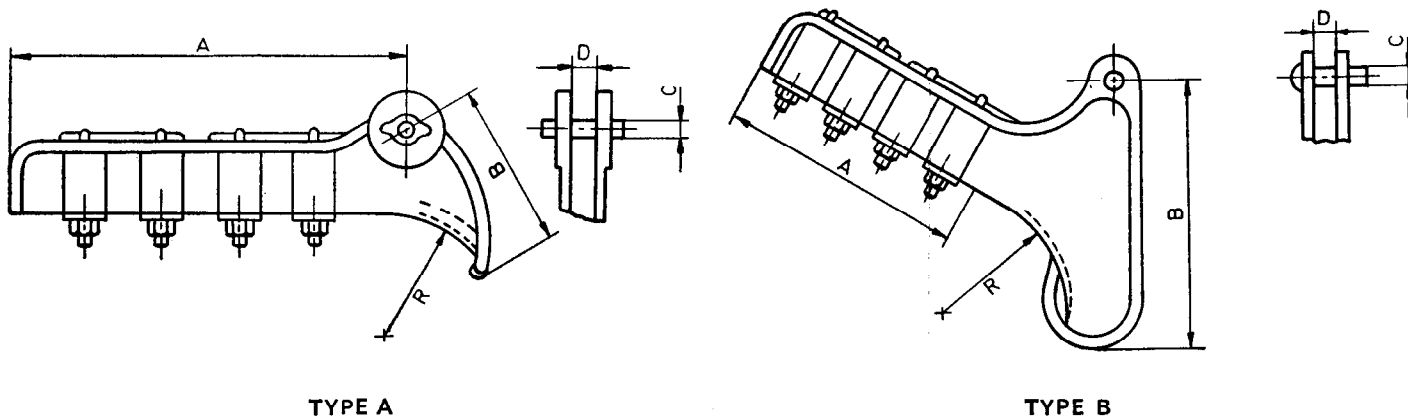
FIG. 16 CLEVIS-CLEVIS

**6.12 Clevis-Tongue** — The clevis-tongue shall be of drop forged steel or malleable cast iron. The clevis-tongue shall be complete with cottor bolt and cottor pin. The cottor bolt and the cottor pin shall be of forged steel.

The shape and dimensions of clevis-tongue shall be as shown in Fig. 18.

**6.13 Sag Adjuster Plate** — The sag adjuster plate shall be of mild steel.

The shape and dimensions of sag adjuster plate shall be as shown in Fig. 19 or according to any other design as agreed upon between the manufacturer and the purchaser.

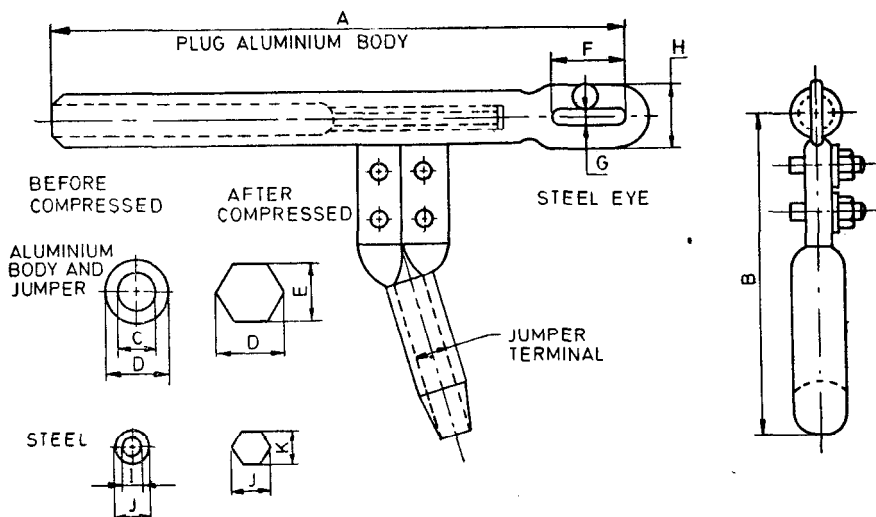


MATERIAL	TYPE OF CLAMP	CONDUCTOR DIAMETER		DIMENSIONS					NUMBER OF U-BOLTS
		Minimum	Maximum	A	B	C	D	R	
Malleable iron	A	11.4	21.6	311.2	127.0	22.2	15.9	96.8	4
		16.5	25.4	412.8	203.2	28.6	15.9	160.3	5
		21.6	31.8	495.3	254.0	31.8	19.0	200.0	6
		24.4	35.6	565.2	254.0	38.1	19.0	203.2	7
	B	5.1	13.9	187.3	203.2	17.5	15.9	95.2	3
		12.2	21.3	274.6	292.1	22.2	15.9	136.5	4
		18.0	27.9	400.0	355.6	30.2	19.0	187.3	5
		19.0	32.5	501.6	381.0	34.9	19.0	206.4	6
Aluminium alloy	A	7.6	17.8	222.2	107.6	22.2	16	76.2	3
		15.2	21.6	330.2	152.4	25.4	16	114.3	4
		17.8	25.4	412.8	203.2	28.6	16	158.8	5
		19.3	30.0	495.3	228.6	31.8	19.0	241.3	6
		25.4	38.1	565.2	254.0	41.3	19.0	254.0	7
	B	5.1	11.7	101.6	149.2	19.0	16	69.8	2
		5.1	13.5	187.3	203.2	19.0	16	95.2	3
		7.6	17.3	238.1	260.4	22.2	16	120.6	4
		12.7	24.4	330.2	327.0	28.6	16	155.6	5
		19.0	32.5	463.6	381.0	34.9	19.0	206.4	6

All dimensions in millimetres.

FIG. 17A STRAIN CLAMP

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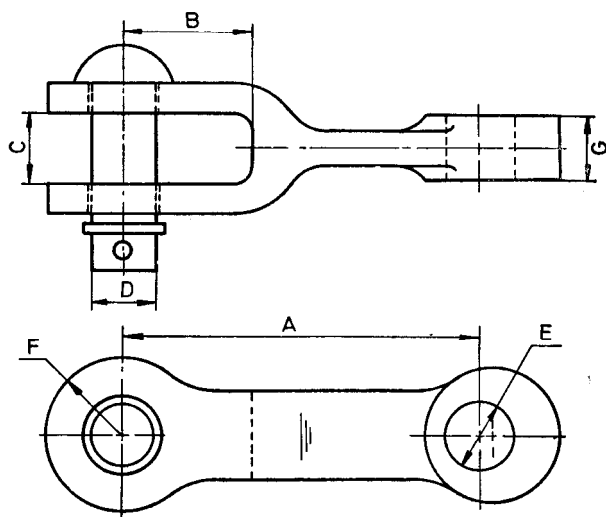


ACSR CONDUCTOR			DIMENSIONS											SIZE AND NUM- BER OF BOLTS
Standard Nominal Copper Area	Stranding and Wire Diameter		A	B	C	D	E	F	G	H	I	J	K	
	Alumi- nium	Steel												
65	6/4-72	7/1-57	391	196	15.3	26	22.5	50	20	12	5.0	12	10.4	M12/2
80	6/5-28	7/1-90	431	222	17.0	30	26.0	50	20	12	5.6	12	10.4	M12/2
80	26/2-54	7/1-90	431	222	17.0	30	26.0	50	20	12	6.0	12	10.4	M12/2
80	30/2-36	7/2-36	440	222	17.7	30	26.0	50	20	18	7.4	16	13.9	M12/2
95	30/2-59	7/2-59	465	234	19.3	34	29.4	50	20	18	8.1	18	15.6	M12/2
110	30/2-79	7/2-79	465	234	20.8	34	29.4	50	20	18	8.8	18	15.6	M12/2
130	30/3-00	7/3-00	510	266	22.2	38	32.9	50	20	18	9.4	20	17.3	M16/2
140	30/3-18	7/3-18	510	266	23.5	38	32.9	50	20	18	9.9	20	17.3	M16/2
160	30/3-35	7/3-35	573	284	24.8	44	38.1	60	22	20	10.5	22	19.1	M16/2
185	30/3-71	7/3-71	579	284	27.4	44	38.1	60	26	24	11.5	24	20.8	M16/2
225	30/3-99	7/3-99	624	301	29.3	48	31.6	60	26	24	12.4	26	22.5	M12/4
260	30/4-27	7/4-27	659	317	31.3	52	45.0	60	26	24	13.3	28	24.2	M12/4
258	54/3-18	7/3-18	629	317	29.8	52	45.0	60	26	24	9.9	24	20.8	M12/4
300	30/4-50	7/4-50	659	317	32.9	52	45.0	60	26	24	14.0	30	26.0	M12/4
300	54/3-35	7/3-35	659	317	31.5	52	45.0	60	26	24	10.5	28	24.2	M12/4
325	54/3-53	7/3-53	659	333	33.2	54	46.8	60	26	24	11.0	24	20.8	M12/4

*Material* — Aluminium alloy.

All dimensions in millimetres.

FIG. 17 STRAIN CLAMP ( COMPRESSION TYPE )



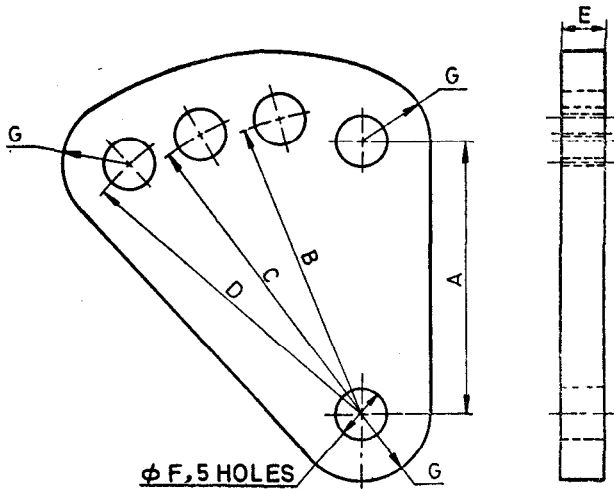
DIMENSIONS, mm

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>	<i>G</i>
89	32	19	16	17.5	19	16
102	35	19	16	17.5	22	19
102	35	19	16	17.5	22	25
140	54	22	19	21	25	29
140	54	22	19	21	25	32
140	54	22	19	21	25	35
140	54	22	19	21	25	38

*Material* — Forged steel or malleable cast iron.

FIG. 18 CLEVIS-TONGUE





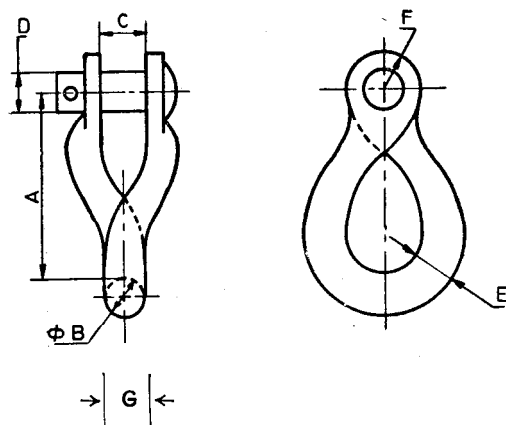
DIMENSIONS, mm						
A	B	C	D	E	F	G
76	102	127	152	16	17.5	22
76	102	127	152	19	21	29
89	114	140	165	22	24	32

*Material* — Mild steel.

FIG. 19 SAG ADJUSTER PLATE

**6.14 Twisted Shackle** — The twisted shackle shall be of forged steel. The twisted shackle shall be complete with cottor bolt and cottor pin. The cottor bolt and the cottor pin shall be of forged steel.

The shape and dimensions of the twisted shackle shall be as shown in Fig. 20.



DIMENSIONS, mm						
A	B	C	D	E	F	G
76	16	19	16	16	19	16
89	16	19	16	13	19	16
102	19	22	19	19	22	19
102	22	25	22	19	22	19

*Material* — Forged steel.

FIG. 20 TWISTED SHACKLE